

Minnesota DOT Work Plan for Developing a Transportation Asset Management Plan

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1.0 INTRODUCTION

On July 6, 2012, President Obama signed into law new highway legislation, the first long-term highway authorization enacted since 2005. That legislation, commonly known as the “Moving Ahead for Progress in the 21st Century Act” (or MAP-21), funds transportation programs for fiscal years 2013 and 2014. In addition to providing funding, the legislation establishes a performance-based Federal highway program that focuses on national transportation goals, increases the accountability and transparency of the Federal highway programs, and supports the use of performance data to drive investment decision making. It also includes a requirement for States to develop “a risk-based asset management plan for the National Highway System to improve or preserve the condition of the assets and the performance of the system.” The State asset management plan is to include investment strategies that will lead to an improvement program that enables the State to make progress towards their performance targets and that supports progress towards national goals. Although the legislation only requires the plan to include pavement and bridge assets on the National Highway System (NHS), States are encouraged to include all infrastructure assets within the right-of-way corridor in their plan.

At a minimum, MAP-21 requires the TAMP to include the following information:

- A summary listing of the pavement and bridge assets on the National Highway System in the State, including a description of the condition of those assets.
- Asset management objectives and measures.
- The identification of any performance gap.
- A lifecycle cost and risk management analysis.
- A financial plan.
- Investment strategies.

The Federal Highway Administration (FHWA) is currently in the process of developing rules that will define the minimum requirements to comply with MAP-21. Although those requirements are not clear at this point in time, the FHWA is expected to assume responsibility for reviewing the asset management plan development process in order to ensure that the plan leads to investment decisions that achieve strategic performance objectives, minimize life cycle costs, and reduce risk.

MAP-21 provides flexibility in how a State develops its asset management plan. To provide guidance to State DOTs in meeting the MAP-21 requirements, the FHWA initiated a pilot project to assist three state agencies with the development of their TAMP. The Minnesota DOT (MnDOT) is one of the three participating agencies, along with the Louisiana Department of Transportation and Development (LA DOTD) and the New York State DOT (NYSDOT). As part of the project, the FHWA’s contractor will provide technical guidance to MnDOT during the development of its TAMP. In addition, MnDOT has contracted with Applied Pavement Technology, Inc. (APTech) to provide additional assistance in developing its first formal TAMP.

This document outlines a plan for conducting the work required to develop the Department’s first formal TAMP. It is based on input from MnDOT’s Asset Management Steering Committee and Project Management Team (PMT), which include members from a broad cross-section of the Department and the FHWA.

2.0 TAMP PURPOSE AND SCOPE

2.1 TAMP Objectives

Because of the importance to managing its transportation assets using asset management principles, MnDOT has elected to develop a comprehensive TAMP that captures the spirit of the MAP-21 legislation and exceeds the minimum requirements outlined in the legislation. In addition, the TAMP development will be coordinated and consistent with the concurrent activities being undertaken as part of the FHWA pilot program, aligned with guidance provided in the AASHTO *Transportation Asset Management Guide – A Focus on Implementation*, and accepted by key stakeholders. The TAMP will formalize and document the following key information:

- Defined levels of service or performance targets.
- Current condition or performance of assets.
- Risk-based tradeoff analysis within and among selected asset types.
- Identification of lower cost strategies for managing assets through their life cycle.
- Impact of investment scenarios for both capital needs and operations and maintenance budgets for each asset type.
- Development of longer term operations/maintenance investment plans for identified asset types.
- Identification of data needs moving forward.

As a result, MnDOT will successfully achieve the following objectives, which were conveyed by Mr. Michael Barnes at the 2013 Annual Meeting of the Transportation Research Board:

- Bridge more completely the gap between capital investment decisions and budgeting activities for operations and maintenance.
- Expand the use of asset management principles to two asset types beyond pavements and bridges.
- Formally consider risk and performance criteria in investment decisions.
- Document the Department's existing asset management practices.
- Improve the transparency of investment decisions.
- Satisfy the requirements outlined in MAP-21.

2.2 TAMP Scope

The MnDOT TAMP is expected to formalize and document key information on the following five asset classes:

1. Pavements.
2. Bridges.
3. Drainage.
4. Tower Lighting.
5. Overhead Sign Structures.

For each asset class, the following information will be incorporated into the TAMP:

- Asset inventory and conditions.
- Asset management objectives and measures.

- Performance gap assessment.
- Lifecycle cost considerations.
- Risk management analysis.
- Financial plan.
- Investment strategies.
- Asset management process enhancements

2.3 Managing the TAMP Development

The development of MnDOT's TAMP will be led by Mr. Mark Nelson, Mr. Kirby Becker, and Mr. Matthew Malecha from the Office of Statewide Multimodal Planning. Mr. Nelson serves as the contact for the FHWA pilot study. Mr. Malecha served as the initial Project Manager for the consulting contract with APTEch and Mr. Becker will assume responsibility for Project Management beginning July 9, 2013.

2.4 TAMP Development Timeframe

MnDOT plans to have a first draft of its TAMP completed by March 2014 with a final version of the TAMP completed by May 2014. A more detailed schedule outlining specific milestones and delivery dates is provided in chapter 6 of this document.

3.0 PARTICIPANTS IN DEVELOPING THE TAMP

The TAMP will be developed through the cooperative efforts of several committees, work groups, and outside contractors, as described below.

3.1 Steering Committee

The Steering Committee will provide general direction to the TAMP effort and will assist in communicating the purpose and progress to other stakeholders. The following individuals comprise the Steering Committee:

Office of Statewide Multimodal Planning

- Mark Nelson
- Matthew Malecha
- Kirby Becker

Office of Transportation Data and Analysis

- Cassandra Isackson

Office of Capital Programming and Performance Measures

- Mark Gieseke
- Deanna Belden
- Shawn Walding
- Ryan Wilson

Office of Maintenance

- Sue Lodahl

Operations (Greater Minnesota Districts – District 8)

- Dave Solsrud

Office of Finance

- Duane Leurquin

Materials Office

- Keith Shannon
- Curt Turgeon
- Dave Janisch

Office of Transit

- Mike Schadauer

Operations (Metro District)

- Bev Farraher
- Trisha Nelson
- Steve Misgen

Bridge Office

- Nancy Daubenberger
- Tom Styrbicki
- Thomas Martin

Enterprise Risk Management

- Eric Davis

Traffic, Safety & Technology

- Ray Starr

Federal Highway Administration (Minnesota Division Office)

- Dave Scott

- Bill Lohr

3.2 Project Management Team

A multi-disciplinary Project Management Team (PMT) will manage the overall TAMP effort and be very involved in project management tasks, such as workplan development. The PMT will also collaborate with the outside contractors on a regular basis and serve as members of the technical Work Groups. Members on the PMT include the following individuals, all of whom also serve on the Steering Committee:

Office of Statewide Multimodal Planning

- Mark Nelson
- Matthew Malecha
- Kirby Becker

Office of Transportation Data and Analysis

- Cassandra Isackson

Office of Capital Programming and Performance Measures (OCPPM)

- Deanna Belden
- Ryan Wilson

Office of Maintenance

- Sue Lodahl

Operations (Greater Minnesota Districts – District 8)

- Dave Solsrud

Materials Office

- Curt Turgeon

Operations (Metro District)

- Trisha Nelson

Bridge Office

- Tom Styrbicki

Enterprise Risk Management

- Eric Davis

Traffic, Safety & Technology

- Ray Starr

3.3 Work Groups

Four Work Groups will be developed around specific asset types. These groups will assist in documenting current practices in terms of risk management, lifecycle costing, gap identification, and financial planning. The groups will also provide the information needed for the contractor to develop or review defined levels of service, performance measures and targets, and maintenance and capital cost estimates for identified asset types. The initial members of the Work Groups include the following individuals:

Pavement

- Curt Turgeon, Materials Office
- Dave Janisch, Materials Office
- Tom Meath, Materials Engineer, District 6
- Mike Kamnikar, Operations (Metro District)
- Cliff Gergen, Operations (Metro District)

- Chris Kufner, Operations (Metro District)
- Mark Panek, Operations (District 6)
- Craig Gertsema, Operations (District 8)
- Representative(s) from OCPPM – Investment Planning
- Representative(s) from OCPPM – Performance Measures

Bridge

- Tom Stybicki, Bridge Office
- Thomas Martin, Bridge Office
- Pat Huston, Operations (District 1)
- Jim Stoutland, Bridge/Signs/Construction (District 8)
- Representative(s) from OCPPM – Investment Planning
- Representative(s) from OCPPM – Performance Measures

Hydraulics/Drainage

- Dave Solsrud, Operations, District 8
- Andrea Hendrickson, Bridge Office, Hydraulics Unit
- Bonnie Peterson, Bridge Office, Hydraulics Unit
- Beth Neuendorf, Water Resources Engineer (Metro District)
- Jim Michaels, Operations (Metro District)
- Dave Redig, Operations (District 6)
- Representative(s) from OCPPM – Investment Planning
- Representative(s) from OCPPM – Performance Measures

Overhead Sign Structures and Tower Lighting (High Mast Lighting)

- Trisha Nelson, Operations (Metro District)
- Eric Evens, Bridge Office (Oakdale)
- Thomas Martin, Bridge Office
- John Pedersen, Traffic (Metro District)
- Barry Glassman, Bridge Office
- Steve Misgen, Operations (Metro District)
- Ray Starr, Traffic, Safety & Technology
- Representative(s) from OCPPM – Investment Planning
- Representative(s) from OCPPM – Performance Measures

3.4 FHWA Pilot Study Support

The contractor for the FHWA pilot project is **AMEC** with technical assistance from **Cambridge Systematics**. The FHWA contractor has responsibility for providing technical assistance to the three participating states and developing TAMPs for the three pilot states that comply with legislated requirements. Key contacts for the AMEC/Cambridge Systematics team include Mr. Jonathan Groeger, AMEC, and Mr. Joe Guerre, Cambridge Systematics.

3.5 MnDOT Contractor Support

MnDOT recently contracted with Applied Pavement Technology, Inc. (**APTech**) to assist with the development of MnDOT's comprehensive TAMP. As part of the contract, APTech will facilitate meetings of the PMT and Work Groups and will guide efforts that will conclude in the development of a comprehensive TAMP and a corresponding brochure. Ms. Katie Zimmerman

is the Principal Investigator for APTech. She will be assisted by Mr. Prashant Ram, APTech, and Mr. Paul Thompson, an individual consultant to the team.

4.0 TAMP OUTLINE

MnDOT has elected to follow the outline provided in the FHWA *Generic Work Plan for Developing a TAMP* to help ensure consistency with the products produced by the other pilot states. Throughout the development, some changes to the outline may be made to address MnDOT's needs. The preliminary outline is presented as table 4.1.

Table 4.1. Preliminary TAMP Outline

Section	This Section Will....
1. Asset Inventory and Conditions	<ul style="list-style-type: none"> • Summarize the inventory and condition of pavements, bridges, hydraulic/drainage structures, overhead sign structures, and tower lighting. • Summarize what is and what is not included in the inventory and what is known about the assets in an asset register. • Describe the Department’s level of confidence in the information provided.
2. Asset Management Objectives and Measures	<ul style="list-style-type: none"> • Describe the objectives of the asset management program. • Describe measures and levels of service, including both customer level of service and technical levels of service. • Present desired and financially-constrained performance targets based on the financial plan. • Document the process used to develop the above items.
3. Performance Gap Assessment	<ul style="list-style-type: none"> • Describe short- and long-term asset management planning horizons. At a minimum, the TAMP will reflect a 10-year planning horizon. • Describe legislated or customer survey results related to asset performance. • Link the performance to national goal areas, as appropriate. • Describe traffic growth and other system demands that impact the performance of each of the five asset classes. • Present an analysis of future funding versus condition scenarios. • Illustrate the performance gap between existing conditions and future condition targets. • Estimate the cost of addressing the gap in performance. • Document the process used to conduct the performance gap analysis.
4. Lifecycle Cost Considerations	<ul style="list-style-type: none"> • Describe “lifecycle costs” and explain why they are important.

Section	This Section Will....
	<ul style="list-style-type: none"> • Provide an example of a typical deterioration model. • Describe strategies for managing assets over their whole life, from inception to disposal, illustrating the use of a sequence of activities, including maintenance and preservation treatments. • Document the typical lifecycle cost of the assets included in the TAMP. • Document the typical lifecycle cost of adding a new lane mile of roadway and document a process for considering future maintenance costs when evaluating potential roadway expansion projects. • Document the tools used by the agency to manage assets effectively over their life cycle.
5. Risk Management Analysis	<ul style="list-style-type: none"> • Describe MnDOT’s process for assessing and managing risks. • Document the agency and program risks that could impact MnDOT’s ability to achieve the goals documented in the TAMP. • Summarize the agency and program risks in a risk register that includes the likelihood and consequences of occurrence and recommendations for mitigation. • Document the process used to evaluate risks.
6. Financial Plan	<ul style="list-style-type: none"> • Summarize historic funding levels for the five assets included in the TAMP. • Describe the amount of funds expected to be available for these assets over the next 10 years and describe where these funds will come from. • Describe how these funds will be allocated over the 10-year horizon. • Describe the financial sustainability of the proposed funding levels. • Document the sources of information used to develop the financial plan. • Document any assumptions made in preparing the financial plan.
7. Investment Strategies	<ul style="list-style-type: none"> • Present recommended investment strategies that will enable MnDOT to achieve its performance targets (using information from the previous sections). • Document the process used to evaluate and select

Section	This Section Will....
	investment strategies.
8. Asset Management Process Enhancements	<ul style="list-style-type: none">• Document a governance plan for the TAMP, documenting how it will be used, when it will be updated, and so on.• Describe priorities for asset management process enhancements.• Provide plans for expanding the TAMP to include other assets.
Appendices	<ul style="list-style-type: none">• Support the information contained in the TAMP.

5.0 INFORMATION NEEDED TO DEVELOP THE TAMP

This section of the Work Plan describes the information and work activities that are required to develop MnDOT's TAMP. The activities are organized by the TAMP outline presented in table 4.1. The organization of the meetings that will take place during the TAMP development are outlined in chapter 6.

5.1 Asset Inventory and Conditions

To develop this portion of the TAMP, the following activities are required:

1. Develop an asset register showing the number of each asset, current replacement value, current condition, office responsible for the data, and confidence level in the data.
2. Compile documentation on the procedures used to assess asset condition.

The individual Work Groups are responsible for completing the asset register and providing information on the condition survey procedures.

5.2 Asset Management Objectives and Measures

To develop this portion of the TAMP, the following activities are required:

3. Summarize the performance measures and targets documented in the *Annual Minnesota Transportation Performance Report (2011)* and the *Statewide Highway Systems Operation Plan (2012)*.
4. Assess the adequacy of the performance measures to make investment decisions and make any recommendations for changes.
5. Determine whether any additional performance measures are needed to report progress towards national goal areas.
6. Document the process for developing performance measures and establishing performance targets.
7. Recommend to the Steering Committee any changes to performance measures that might be required.
8. Document the process for using performance data to support asset management investment decisions at MnDOT.

The individual Work Groups are responsible for completing items 1 through 4, with technical assistance from APTEch. The PMT will determine whether any new performance measures should be recommended to the Steering Committee (item 5) and will provide the information needed to complete items 6.

5.3 Performance Gap Assessment

To develop this portion of the TAMP, the following activities are required:

9. Develop and document a process for predicting asset conditions under different investment scenarios.
10. Summarize the results of customer surveys relevant to the performance of the five assets included in the TAMP.
11. Summarize any legislated or mandated performance requirements for the five assets included in the TAMP.

12. Describe factors that will impact future demand in terms of traffic growth, economic development, or other trends. Describe whether these demand forecasts are based on studies or estimates.
13. During the development of the financial plan and investment strategies, provide estimated asset conditions and unfunded needs.

The individual Work Groups will be responsible for completing items 1 through 4. During the development of the budgeting portion of the TAMP, APTEch will work with the individual Work Groups to use the predicted asset conditions to estimate the performance gap in terms of condition and cost.

5.4 Lifecycle Cost Considerations

To develop this portion of the TAMP, the following activities are required:

14. Document the typical types of maintenance and capital improvements that are performed over the life cycle of each of the five assets included in the TAMP. To prepare this information, it may be useful to separate activities into no more than two classifications (e.g., NHS and non-NHS routes) to highlight cost differences. For each of these classifications, summarize typical treatment strategies, the point at which the treatments are applied (in terms of either condition or years), and the cost of each treatment.
15. Estimate the future maintenance costs associated with a new lane mile of pavement and correlate that cost to other maintenance activities. Conduct the same activity for bridges.
16. Document how maintenance costs are currently taken into consideration by MnDOT and how they will be considered in the future.

The individual Work Groups will be responsible for completing item 1. APTEch will work with the PMT to develop recommendations for item 2 and with the Steering Committee to address item 3.

5.5 Risk Management Analysis

To develop this portion of the TAMP, the following activities are required:

17. Develop a risk register appropriate for evaluating agency and program risks associated with the development and implementation of the TAMP, using MnDOT's *Enterprise Risk Management Framework and Guidance* (2013) as a reference.
18. Individual work groups identify risks for their program area.
19. Facilitate a workshop to identify and evaluate risks using the risk register.
20. Document the highest risks to the Department and the plans for mitigating those risks in the TAMP.
21. Document the process used for the risk analysis.

APTEch will work with the Enterprise Risk Management office to develop the risk register. Together with the FHWA's Pilot Study contractor, the team will facilitate a risk workshop using the risk register. APTEch will document the results of the workshop and will work with the PMT to document the risk management process for the TAMP.

5.6 Financial Plan

To develop this portion of the TAMP, the following activities are required:

22. Compile historic funding levels for the five assets included in the TAMP.
23. Compile existing information on future revenue projections, including documentation of the revenue sources.
24. Document proposed funding levels for each of the assets included in the TAMP over a 10-year planning horizon. In conjunction with the development of investment strategies, estimate future conditions under each funding level and show difference in performance between a worst-first and preservation strategy.
25. Develop and implement a process for assessing the financial sustainability of the transportation system, using pavements and bridges as an example.
26. Document the process used to develop the financial plan, including information on the management systems available to support the analysis.
27. Document any assumptions used in preparing the analysis.

The individual Work Groups are responsible for completing items 1 through 3. APTech will work with the PMT and the FHWA's Pilot Study consultant to complete items 4 through 6.

5.7 Investment Strategies

To develop this portion of the TAMP, the following activities are required:

28. For the funding strategies developed in section 5.6, define investment strategies that reflect a sound, whole life approach to managing assets.
29. Compare the recommended whole life approach to other strategies for asset management, such as a worst-first strategy.
30. Document the process used to define investment strategies, including information on the management systems available to support the analysis.
31. Document any assumptions used in preparing the analysis.

The individual Work Groups will be responsible for completing items 1 through 3. APTech will work with the PMT to complete item 4.

5.8 Asset Management Process Enhancements

To develop this portion of the TAMP, the following activities are required:

32. Throughout the TAMP development process, identify opportunities for process, system, and data enhancements.
33. Recommend additional assets to be incorporated into future TAMPs and develop a plan for obtaining the required information.
34. Document the process used to develop the asset management enhancement plan and to set enhancement priorities.
35. Develop and document a TAMP governance process that defines how the TAMP will be used, how it will be updated, and so on.

Throughout the TAMP development process, the individual Work Groups and the PMT will identify and document recommendations for enhancements to the development of future TAMPs. The PMT will be responsible for addressing items 2 through 4.

5.9 Appendices

Throughout the development of the TAMP, individual Work Groups will document their work. Portions of their documentation may be included in appendices to support the recommendations provided in the TAMP.

6.0 PLAN FOR COMPLETING THE DEVELOPMENT OF THE TAMP

The development of a TAMP demands close coordination among the various stakeholder groups to ensure that their efforts are on schedule, that there is consistency in the approaches being used within each asset class, and that the final product meets project objectives. This Work Plan outlines the order in which activities will be conducted, the schedule for facilitated meetings, and the significant milestones for completing the work.

Major Milestones

Table 6.1 presents key milestones and dates for developing the TAMP. The delivery dates represent the point at which the materials that will be incorporated into the TAMP will be delivered to APTEch for incorporation into the comprehensive TAMP. The numbers in parenthesis correspond to the activities described in chapter 5.

The draft TAMP will be submitted to the FHWA and its Pilot Project consultant in March 2014 for review in terms of consistency with other pilot states and with the results of the rule-making process for MAP-21. At the same time, the draft TAMP will be submitted to the Steering Committee for review and comment. The final TAMP and a summary brochure will be submitted in May 2014.

Table 6.1. Major milestones.

Dates	Work Activities
June 28, 2013	Asset inventory and condition complete <ul style="list-style-type: none"> • Asset register complete (#1) • Documentation on condition assessments provided (#2)
July 12, 2013	Asset management and objectives work group activities complete <ul style="list-style-type: none"> • Current performance measures and targets summarized (#3) • Recommendations for changes to performance measures provided (#4) • Links to national goal areas established (#5) • Performance measure documentation provided (#6)
July 29, 2013	Meeting with PMT to discuss asset management and objectives processes <ul style="list-style-type: none"> • Recommend changes to performance measures (#7) • Document the process for using performance data to support investment decisions (#8)
July 30, 2013	Facilitated meeting to discuss approach for lifecycle analysis <ul style="list-style-type: none"> • Assignments given to individual Work Groups
August 30, 2013	Lifecycle cost consideration work group activities complete <ul style="list-style-type: none"> • Document life cycle treatments, timing, and costs (#14) • Estimate future cost of a new lane mile of pavement (#15)
August 30, 2013	Risk register prepared by Enterprise Risk Management office and distributed to individual work groups (#17)
September 13, 2013	Individual work groups submit program area risks
September 20, 2013	Facilitated risk workshop (#19) <ul style="list-style-type: none"> • Documentation of highest risk and mitigation strategies (#20)
September 27, 2013 (revised)	Meeting with PMT <ul style="list-style-type: none"> • How maintenance costs will be taken into consideration in the

	<p>future (#16)</p> <ul style="list-style-type: none"> • Documentation of risk analysis process (#21)
Early October	Facilitated meeting with Work Groups to define process for conducting financial analysis, developing investment strategies, and estimating performance gaps. Include Office of Finance in meetings.
November 1, 2013	<p>Preliminary information for financial plans, investment strategies, and performance gaps submitted.</p> <ul style="list-style-type: none"> • Process for developing predicted conditions in place (#9) • Requirements for minimum performance documented (#10 & #11) • Factors influencing future demand documented (#12) • Summarize historical funding levels and revenue projections (#22, #23 and #24) • Develop preliminary financial plan and investment strategies (#13, #26, #28, #29, #30) • Document assumptions (#27 and #31)
November 15, 2013	<p>Meeting with PMT</p> <ul style="list-style-type: none"> • Review preliminary information for financial plan, investment strategies, and performance gaps • Develop a process for assessing financial sustainability (#25) • Discuss a TAMP governance process (#35)
December 20, 2013	Working groups complete draft financial plans, investment strategies, and performance gaps
February 7, 2014	<p>Asset management process enhancement work group activities completed</p> <ul style="list-style-type: none"> • Submit recommended enhancements (#32)
February 7, 2014	<p>PMT enhancement work activities completed</p> <ul style="list-style-type: none"> • Identify additional assets to include in future TAMPs (#33) • Document enhancement process and priority setting (#34)
March 7, 2014	Draft TAMP delivered to FHWA and MnDOT Steering Committee for review
May 16, 2014	Final TAMP and brochure